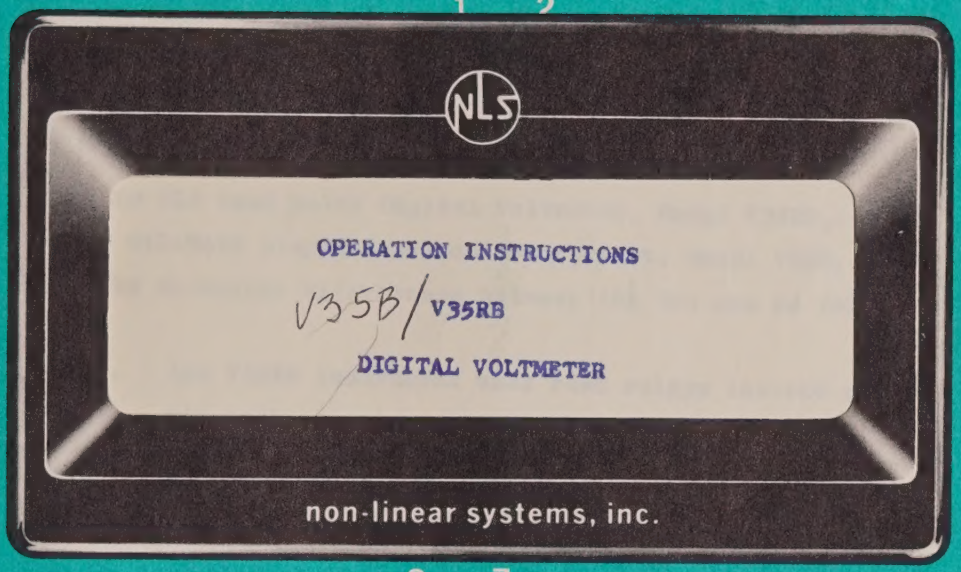

non | linear
systems, inc.

DEL MAR, CALIFORNIA

DOCUMENT NO. 451
June, 1962

OPERATION INSTRUCTIONS

V35B/V35RB

DIGITAL VOLTMETER

This document is complete when accompanied by:

V35B Instruction Manual
NLS Drawings:

11440-500 Sheet 2	E Board, V34RB/V35RB
11440-550 Sheet 2	F Board, V34RB/V35RB
11440-700 Sheet 2	Assembly, Decade Switch

NON-LINEAR SYSTEMS, INC.

Del Mar, California

NON-LINEAR SYSTEMS, INC.

APPROVED BY: R. Hoelscher, A. Christian, J. Block	DEL MAR AIRPORT DEL MAR, CALIFORNIA	DOCUMENT NUMBER 451	REVISION
	OPERATION INSTRUCTIONS	PREPARED BY: A. Christian	DATE
	V35RB	CHECKED BY: J. Block	DATE
	DIGITAL VOLTMETER	RELEASE DATE 6-12-62	PAGE 1 of 1

The NLS Reed Relay Digital Voltmeter, Model V35RB, is very similar to its oil-bath stepping-switch counterpart, Model V35B.

The essential differences between the two are as follows:

1. The V35RB instrument uses reed relays instead of conventional oil-bath stepping switches to perform computing, readout and printout functions.

NOTE:

For operating external equipment such as data printers, readout information is applied in the "voltage level" form to the printout connector. This connector has the same pin designations as the V35B instrument, except that all decade commons are at ground potential. In the V35RB Model, zero volts represents "ON" and -12 volts represents "OFF". Up to 100 ma. may be switched to zero volts and up to 5 ma. may be switched to -12 volts. When switching this 5 ma. to the -12 volts, keep in mind that the return is through the readout lamps.

2. Disregard references in the manual to the two "D" boards which are used to drive the stepping switches. Instead, "E" and "F" boards are provided. These "E" and "F" boards supply signals to the appropriate reed-relay decade, where a counter matrix and buffer convert the signals into pulses which drive the reed relays.

Drawings 11440-500 and 11440-550 show the circuitry of the "E" and "F" boards.

DOCUMENT NO. 399

PRELIMINARY NOTES

MODEL V35B
DIGITAL VOLTMETER

NON-LINEAR SYSTEMS, INC.
Del Mar, Calif.
November, 1961

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Document No. 399

PRELIMINARY NOTES

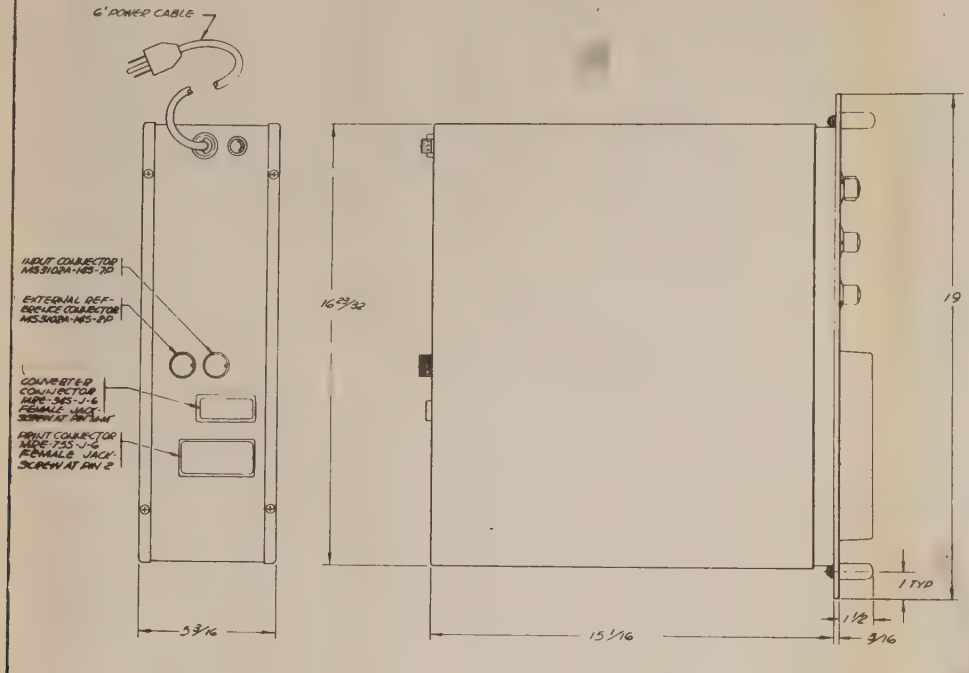
MODEL V35B
DIGITAL VOLTMETER

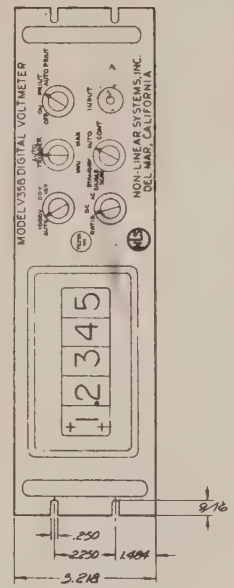
Your N.L.S. Sales and Service Representative will deliver a manual to you as soon as it is off the press. In the meantime the accompanying set of schematic drawings is intended to help you put the instrument to use.

If you need additional information, please contact your regional N.L.S. factory branch office.

SCHEMATIC DRAWINGS

11530	Sheet 3
11530-100	Sheet 2
11420-050	Sheet 2
11430-200	Sheet 2
11430-300	Sheet 2
11420-400	Sheet 2
11420-500	Sheet 2
11420-600	Sheet 2
11400-700	Sheet 2
11430-730	Sheet 2
11420-800	Sheet 2
11420-830	Sheet 2
15004-125	
15004-126	
15094	
11430-860	Sheet 2





INSTRUMENT CHARACTERISTICS

GENERAL

STRUCTURE FABRICATED FROM ALUMINUM ALLOY.
PRINTED CIRCUIT BOARDS MADE FROM COPPER CLAD EPOXY.
READOUT WINDOWS MADE FROM PLEXIGLASS.
VISOR MADE FROM HIGH IMPACT STYRENE PLASTIC.
FRONT PANEL PAINTED LIGHT GRAY PER MIL-E-15090B, TYPE 3 CLASS 1.
CABINET, GOLD ANODIZE.

ELECTRICAL

DIGITS DISPLAYED - 5.
VOLTAGE RANGE, DC VOLTS: ± 9.9999/ 99.999/ 999.99
RANGE CHANGING: AUTOMATIC
POLARITY CHANGING: AUTOMATIC
INPUT IMPEDANCE: 10 MEGOHMS, AT BALANCE.
INTERNAL REFERENCE VOLTAGE: TEMPERATURE COMPENSATED, ZENER DIODE TYPE DC POWER SUPPLY.
ACCURACY: ± .01% OF READING OR ± 1 DIGIT.

RESOLUTION: 1 DIGIT
EXTERNAL REFERENCE VOLTAGE ± 10 TO ± 100 VDC.
EXTERNAL REFERENCE INPUT IMPEDANCE 50,000 OHMS.
PRIMARY POWER: 115/230 VOLTS ± 10%, 50-60 CPS
APPROXIMATELY 150 VOLT-AMPS

FEATURES

INDIVIDUAL PLUG-IN OIL BATH STEPPING SWITCHES.
COMPLETELY TRANSISTORIZED.
BALANCING TIME MAXIMUM: 2.5 SECONDS

SNAP IN READOUT

CONNECTIONS

SIGNAL INPUT CONNECTOR:
A - INPUT
B - INPUT COMMON
C - CHASSIS GROUND
EXTERNAL REFERENCE CONNECTOR:
A - + REFERENCE
B - - REFERENCE
C - REFERENCE COMMON
D - CHASSIS GROUND

11530 SH. 3

REVISIONS				
SYM	APPROVED	DESCRIPTION	DATE	APPROVED

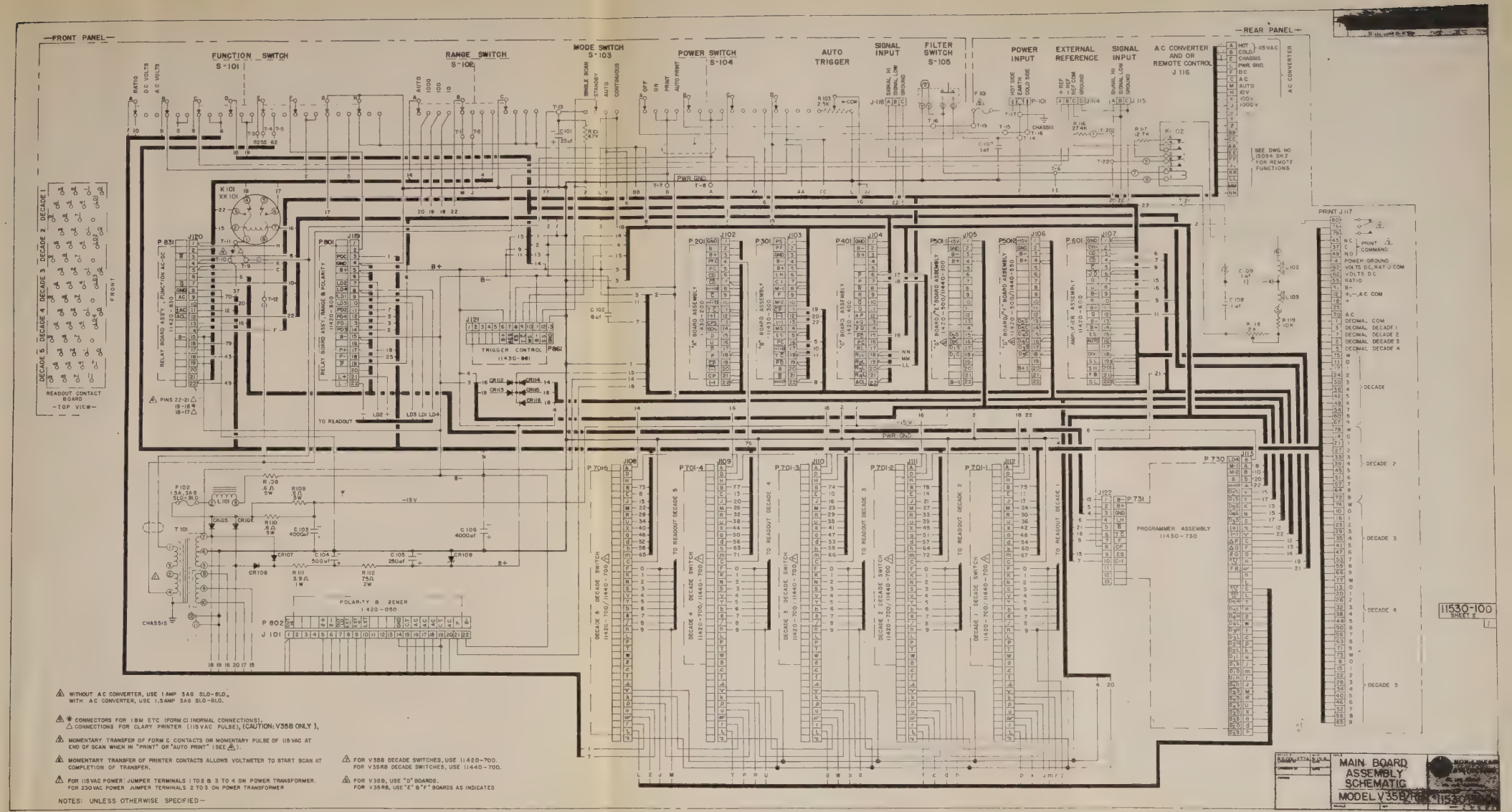
				APPLICATION	
NEXT ASSY	USED ON	NEXT ASSY	FINAL ASSY	QTY REQD	

UNLESS OTHERWISE SPECIFIED — DRAWN G. WALKER 9-8-61 — CHECKED — APPD. R. Hewlett 9-12-61 — MATERIAL — FINISH

TITLE: DIGITAL VOLTMETER MODEL V35B OUTLINE DRAWING

NON-LINEAR SYSTEMS INC. DEL MAR AIRPORT DEL MAR, CALIFORNIA

DRAWING NO. 11530 — SHEET 3 OF 3



⚠ WITHOUT A C CONVERTER, USE 1 AMP 3AG SLO-BLO. WITH A C CONVERTER, USE 1.5AMP 3AG SLO-BLO.

⚠ * CONNECTORS FOR IBM ETC (FORM C) (NORMAL CONNECTIONS). △ CONNECTIONS FOR CLARY PRINTER (115 VAC PULSE), (CAUTION: V35B ONLY).

⚠ MOMENTARY TRANSFER OF FORM C CONTACTS OR MOMENTARY PULSE OF 115 VAC AT END OF SCAN WHEN IN "PRINT" OR "AUTO PRINT" (SEE ⚠1).

⚠ MOMENTARY TRANSFER OF PRINTER CONTACTS ALLOWS VOLTMETER TO START SCAN AT COMPLETION OF TRANSFER.

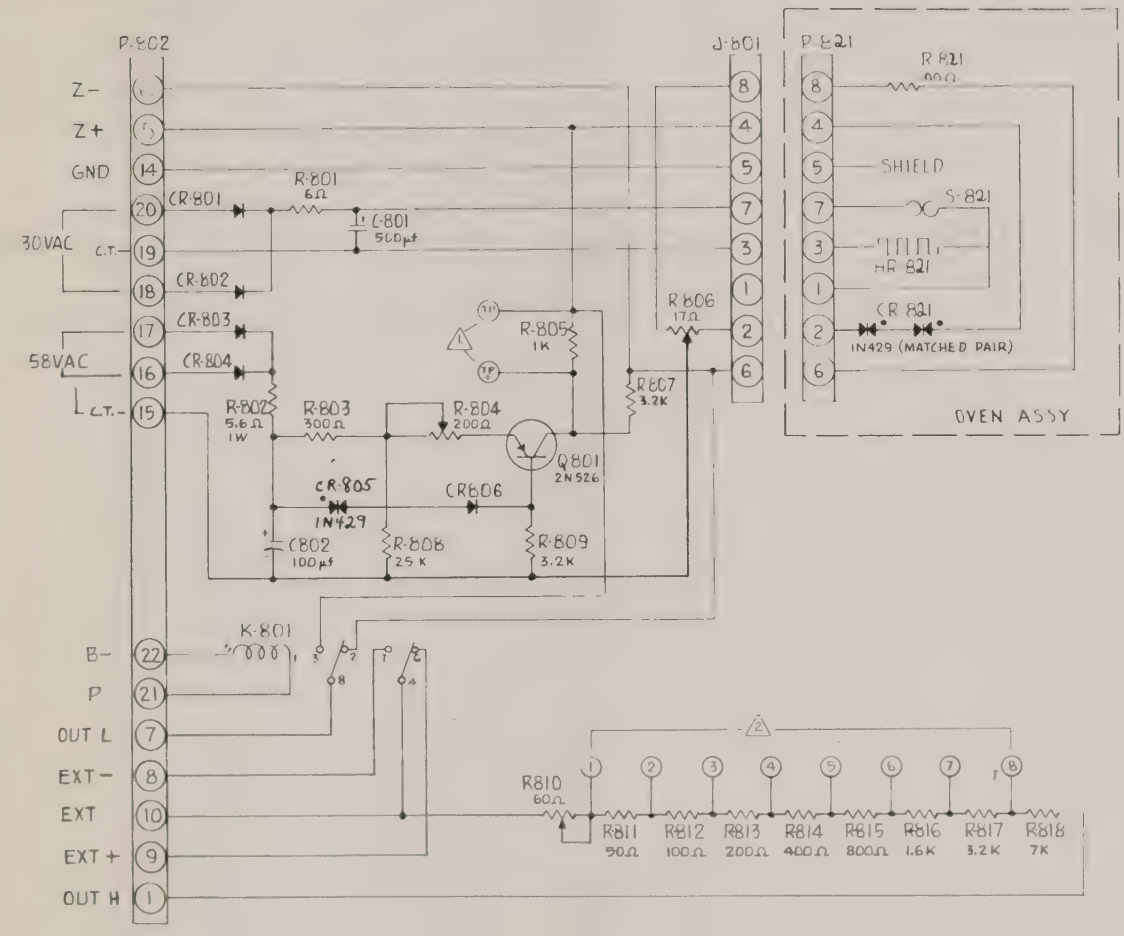
⚠ FOR 115 VAC POWER: JUMPER TERMINALS 1 TO 2 & 3 TO 4 ON POWER TRANSFORMER. FOR 230 VAC POWER JUMPER TERMINALS 2 TO 3 ON POWER TRANSFORMER

⚠ FOR V35B DECADE SWITCHES, USE 11420-700. FOR V35RB DECADE SWITCHES, USE 11440-700.

⚠ FOR V35B, USE "D" BOARDS. FOR V35RB, USE "E" & "F" BOARDS AS INDICATED

NOTES: UNLESS OTHERWISE SPECIFIED—

REVISIONS				
SYM	EFFECT	DESCRIPTION	DATE	APPROVED
1		CHG ST CHG TO A TYP STATE CHG OF RELAY		



⚠2 CERTAIN COMBINATIONS ARE SHORTED TO COMPENSATE FOR ZENER DIODE VOLTAGE (SEE MANUAL)

⚠1 TP1 & TP2 ARE USED IN ADJUSTING THE ZENER REFERENCE

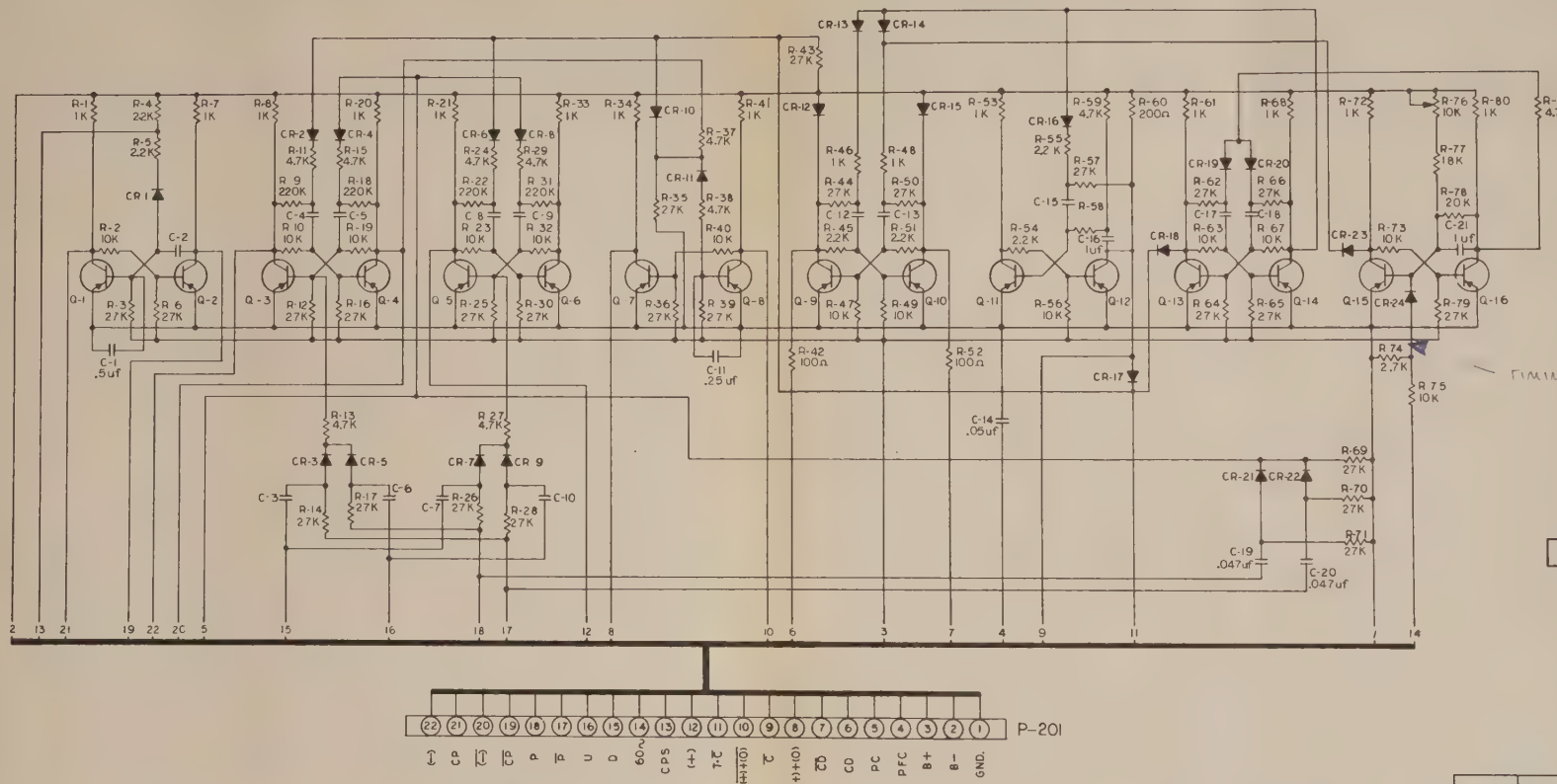
NOTES - UNLESS OTHERWISE SPECIFIED:

APPLICATION	NEXT ASSY

UNLESS OTHERWISE SPECIFIED	DRAWN BY A R BALLIN	DATE
DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTION DECIMAL ANGLES	CHECKED BY	DATE
MATERIAL	APPROVED BY FINISH	

TITLE: SCHEMATIC ZENER SUPPLY ASSEM.

NON-LINEAR SYSTEMS INC
DEL MAR AIRPORT
DEL MAR · CALIFORNIA

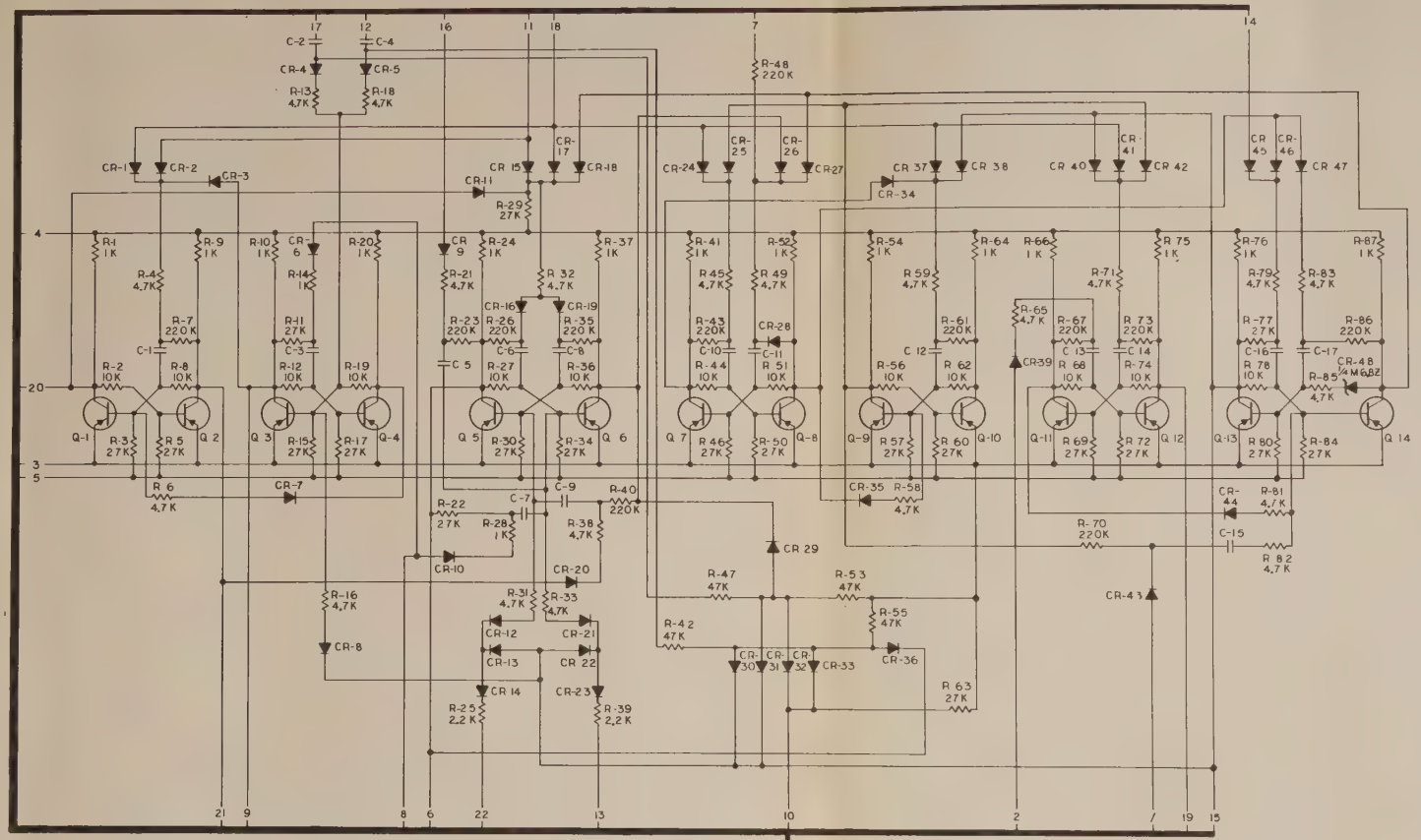


3. TRANSISTORS ARE TYPE 2N1374
2. CAPACITORS ARE .02 uf
1. ALL DIODES ARE NLS TYPE 5003-002

NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED	DRAWN BY B. COLETTA 8-9-61	TITLE SCHEMATIC "A" BOARD ASS'Y.	NON-LINEAR SYSTEMS INC. DEL MAR AIRPORT DEL MAR, CALIFORNIA
	CHECKED BY R. Nelson 9-7-61	V 34B / V 35B	11430-200
MATERIAL		SCALE WT.	SHEET 2 OF 2

APPLICATION QTY REQD



3. TRANSISTORS ARE TYPE 2N1374.
2. CAPACITORS ARE .02uf.
1. DIODES ARE N.L.S. TYPE 5003-002.

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS				
STA	AFFECT	DESCRIPTION	DATE	APPROVAL
1	ALL	R14 & R28 WAS 4.7K	12-9-61	RLH

11430-300
1

UNLESS OTHERWISE SPECIFIED	DRAWN BY	DATE
DIMENSIONS ARE IN INCHES	R. COLLETTA	6-18-61
TOLERANCES ON FRACTION ± DECIMAL ± ANGLES ±	CHECKED BY	DATE
MATERIAL	APPROVED BY	DATE
FINISH		9-7-61

TITLE: SCHEMATIC "B" BOARD ASS'Y.

V34B/V35B

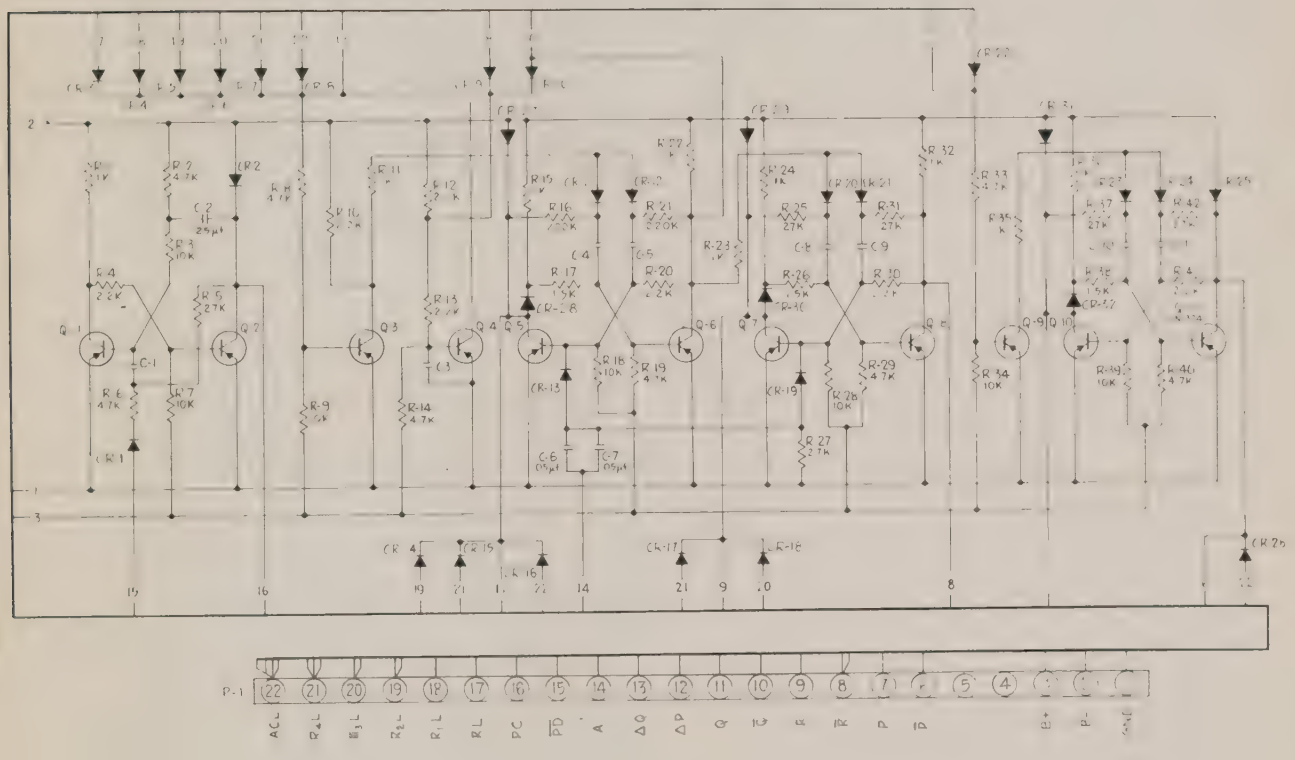
SCALE | WT

NON-LINEAR SYSTEMS INC.
DEL MAR AIRPORT
DEL MAR, CALIFORNIA

11430-300

SHEET 2 OF 2

NEXT ASSY	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY REQD	

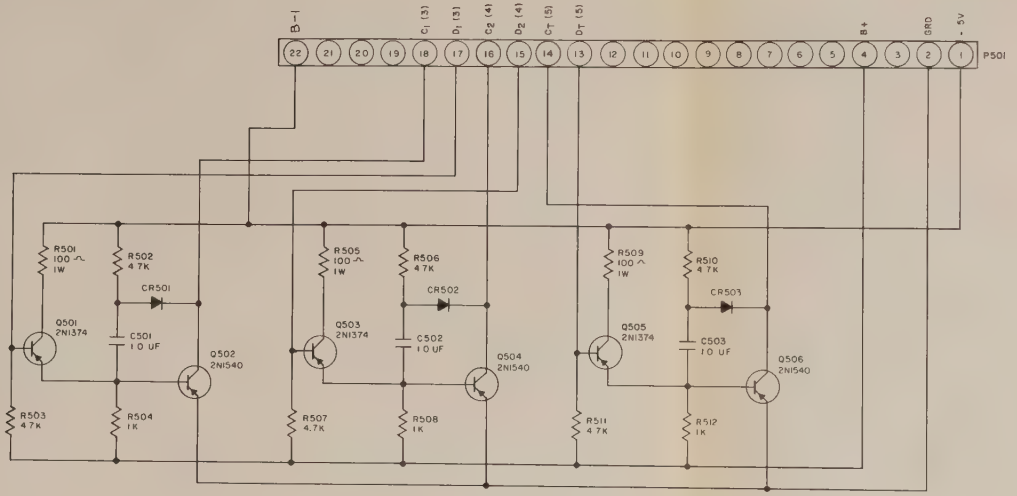


4. ALL COMPONENT REFERENCE NUMBERS ARE IN 400 SERIES, i.e. R 27 = R 427
3. CAPACITORS ARE .02 MFD.
2. DIODES ARE NLS NO. 5003-002
1. TRANSISTORS ARE TYPE 2N1374

NOTES - UNLESS OTHERWISE SPECIFIED.

NLS NON LINEAR SYSTEMS INC

REVISIONS				
DTR	EFFECT	DESCRIPTION	DATE	APPROVAL
1	V35B BLOCK 2	PIN 22 IS CONNECTED TO PIN 1 THIS CHANGE IS NECESSARY TO MAKE THE "D" BD. COMPATIBLE WITH THE V35B BLOCK 2 & V34B BLOCK 1 &U. DOES NOT AFFECT INTER-CHANGABILITY IN PREVIOUS 30 SERIES INSTRUMENTS.	1-24-62	2/14/62



11420-500
SHT 1
1

1. DIODES ARE NLS NO 5003-002
NOTES - UNLESS OTHERWISE SPECIFIED:-

H4-03626

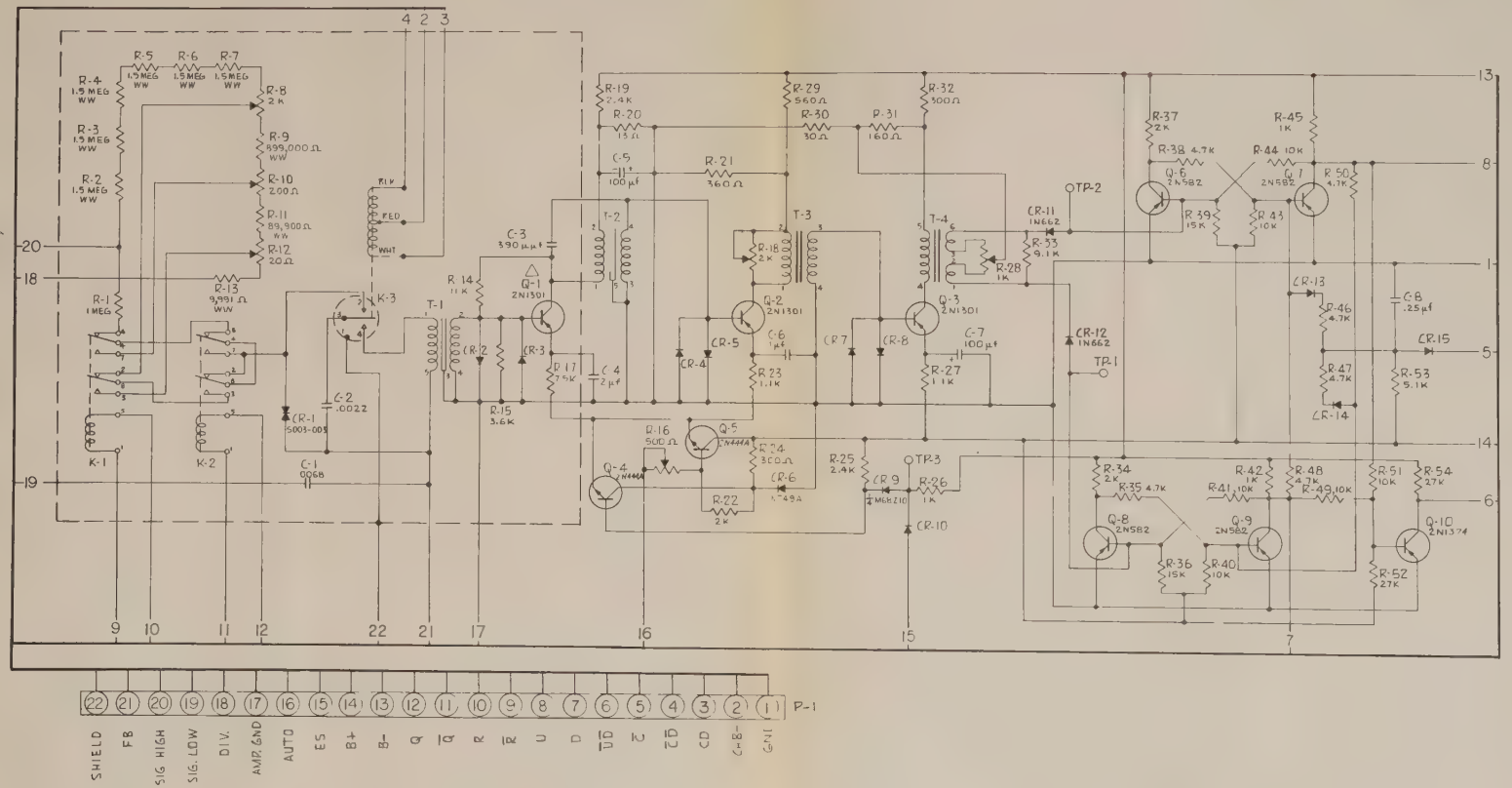
DRAWN	R. COLLIER	9-22-60	
DESIGNED	R.S.H.	9-22-60	
ENGINEER	C.A. Hopkins	9-22-60	

TITLE
"D" BOARD
ASSEMBLY SCHEMATIC
MODEL V34A & V35A

NON-LINEAR SYSTEMS INC
DEL MAR AIRPORT
DEL MAR CALIFORNIA

DRAWING NUMBER
11420-500
SHEET 2 OF

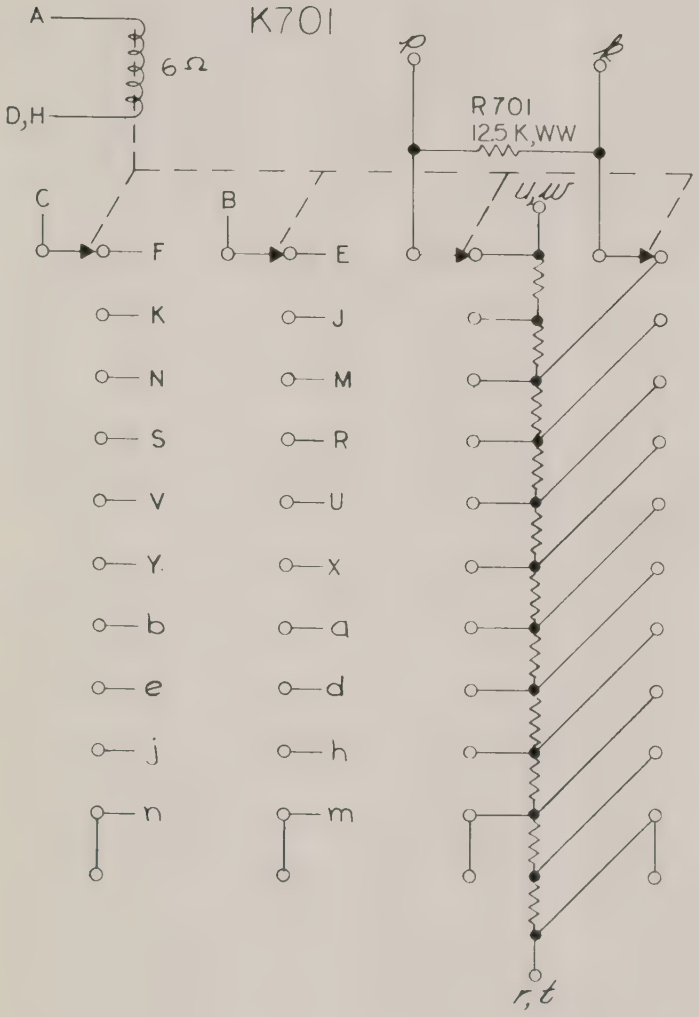
WKLY ASSY	USED ON	WKLY ASSY	FINAL ASSY
APPLICATION		QTY REQD	



11420-600
SHEET 2
2

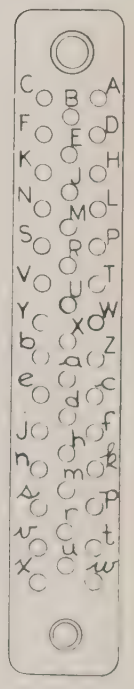
NOTES- UNLESS OTHERWISE SPECIFIED:
1. CAPACITOR VALUE IS IN MICROFARADS.
2 DIODES ARE TYPE 5003-002.
3. ALL COMPONENT REF. NUMBERS ARE IN THE 600 SERIES; I.E. P-1 = P-601
⚠ SELECTED FOR LOW NOISE.

TITLE	SCHEMATIC- AMPLIFIER BD. ASSEM. V34A V35A DIGITAL VOLTMETER
DRAWN	H. Clement 7-30-60
NON-LINEAR SYSTEMS INC.	DEL MAR AIRPORT DEL MAR, CALIFORNIA
DRAWING NUMBER	11420-600
SHEET	2



R702 – 712
5K,WW

P701

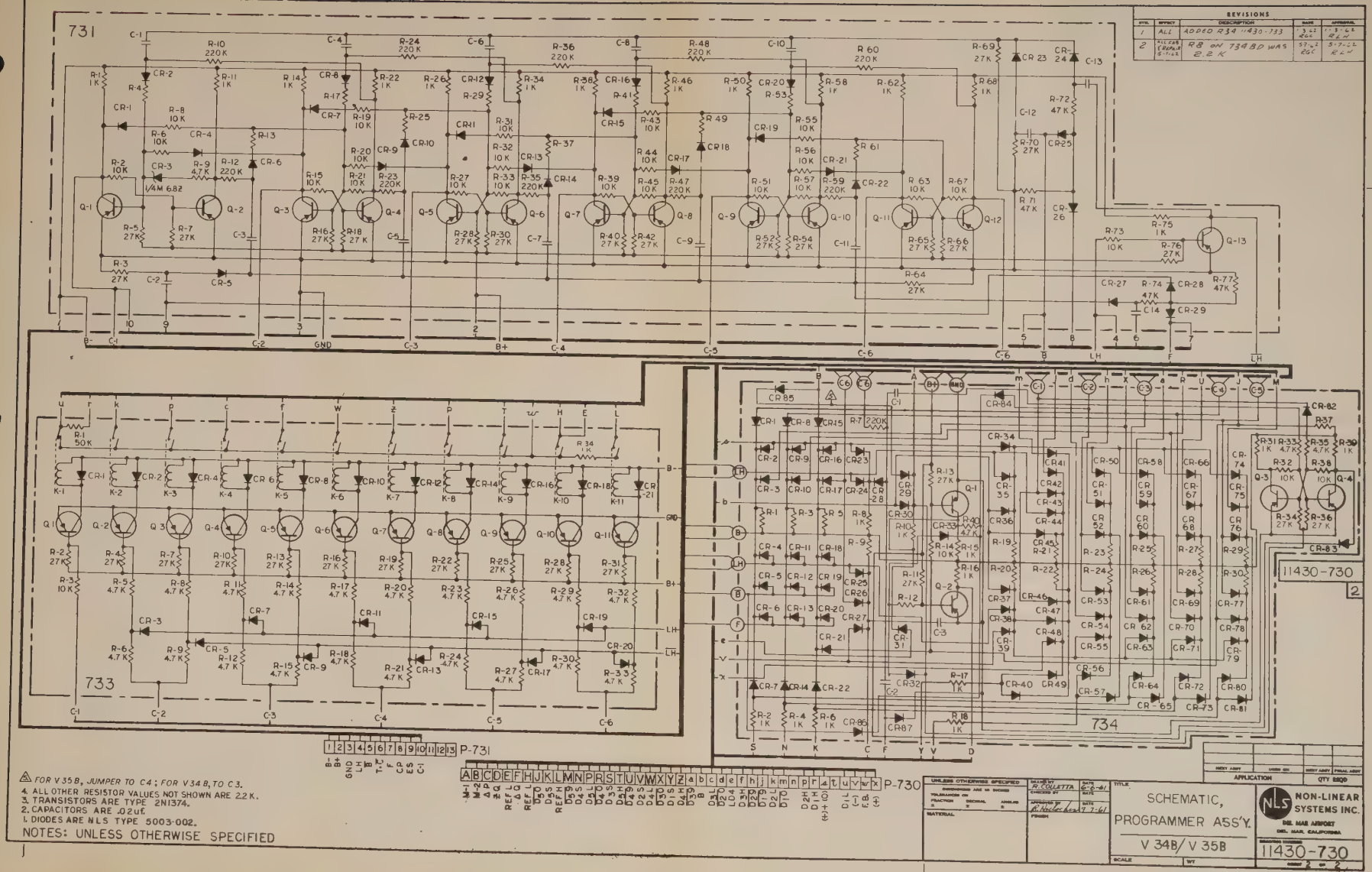


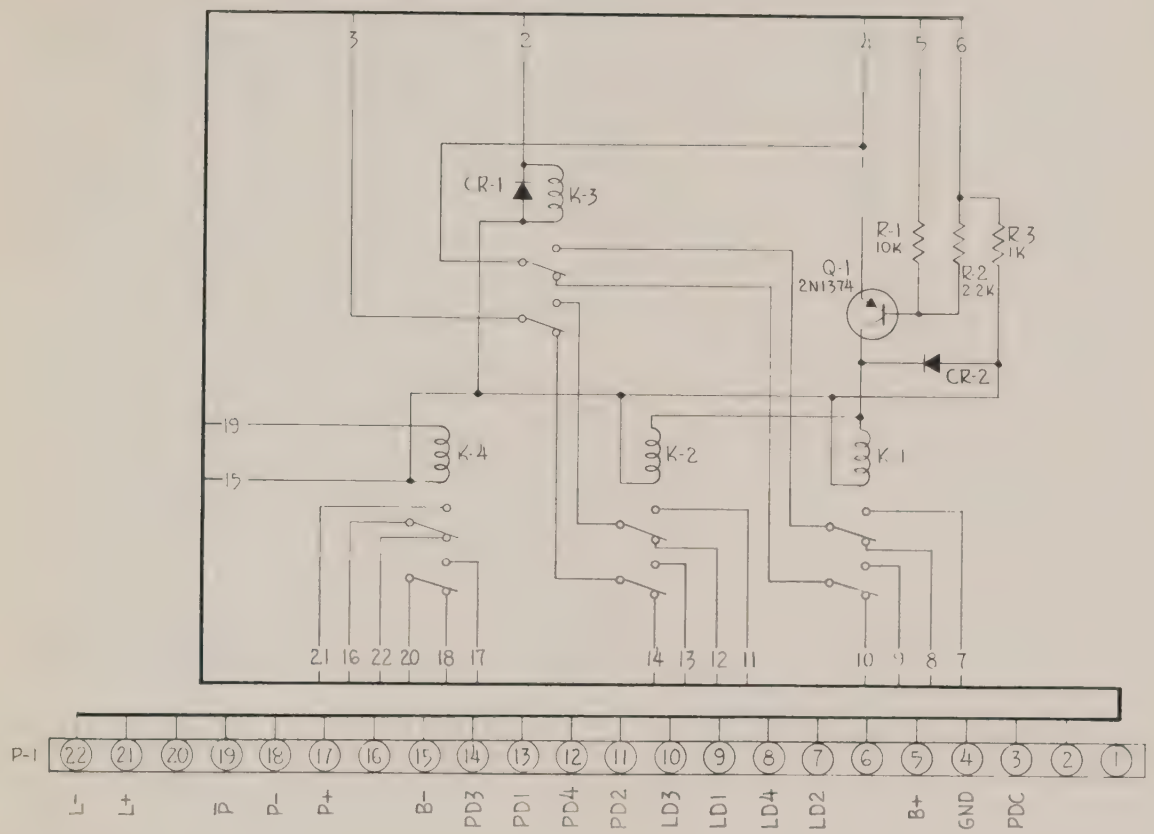
NEXT ASSY	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY REQD	

DRAWN BY: H. SZILLEY	DATE: 6-10-59	TITLE: DECADE SWITCH ASSEMBLY, SCHEMATIC
CHECKED BY: NAIVE	DATE: 6-11-59	
APPROVED BY:	DATE:	
FINISH:		MODEL V34 & V35
SCALE	WT	SHEET 2 OF

NON-LINEAR SYSTEMS INC.
DEL MAR AIRPORT
DEL MAR, CALIFORNIA

DRAWING NUMBER: 11400-700


731
733
734
P-731
P-730
NOTES: UNLESS OTHERWISE SPECIFIED
1. DIODES ARE NLS TYPE 5003-002.
2. CAPACITORS ARE .02uf.
3. TRANSISTORS ARE TYPE 2N1374.
4. ALL OTHER RESISTOR VALUES NOT SHOWN ARE 2.2 K.
FOR V 35B, JUMPER TO C4; FOR V 34B, TO C3.
REVISIONS
SCHEMATIC, PROGRAMMER ASS'Y.
V 34B/ V 35B
NON-LINEAR SYSTEMS INC.
11430-730



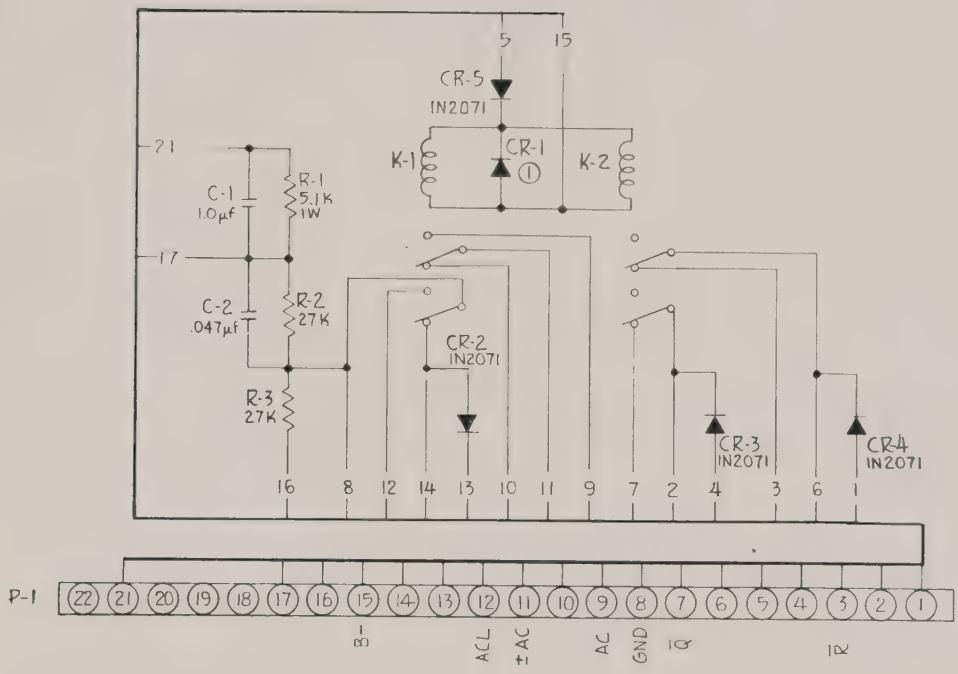
2. COMPONENT REF. NO'S ARE IN 800 SERIES - i.e. R-3 = R-803
1. DIODES ARE NLS NO 5003-UL2

NOTES - UNLESS OTHERWISE SPECIFIED:

APPLICATION	QTY REQD

NON-LINEAR SYSTEMS INC
DEL MAR AIRPORT

RELAY BOARD ASSEMBLY



2. COMPONENT REF. NO'S ARE IN 830 SERIES i.e. CR-4 = CR-834

① NLS NO. 5003-002 DIODE

NOTES - UNLESS OTHERWISE SPECIFIED:-

NEXT ASSY	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY REQD	

UNLESS OTHERWISE SPECIFIED

MATERIAL

FINISH

TITLE

SCHEMATIC

2 RELAY BOARD ASSEMBLY

V-5A V-55A

DIGITAL VOLTMETER

SCALE | WT

NON-LINEAR SYSTEMS INC

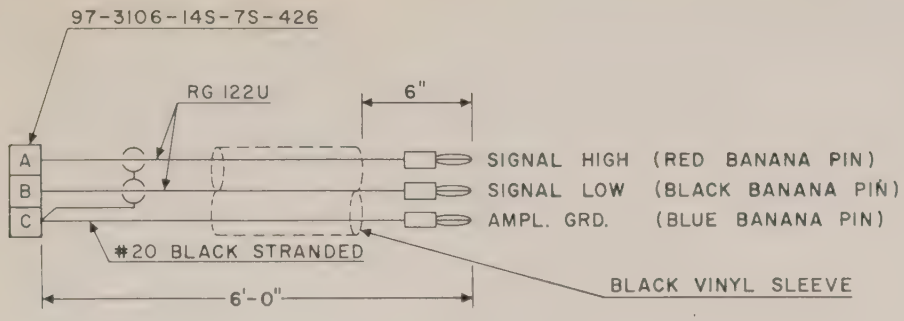
DEL MAR AIRPORT

DEL MAR, CALIFORNIA

DRAWING NUMBER

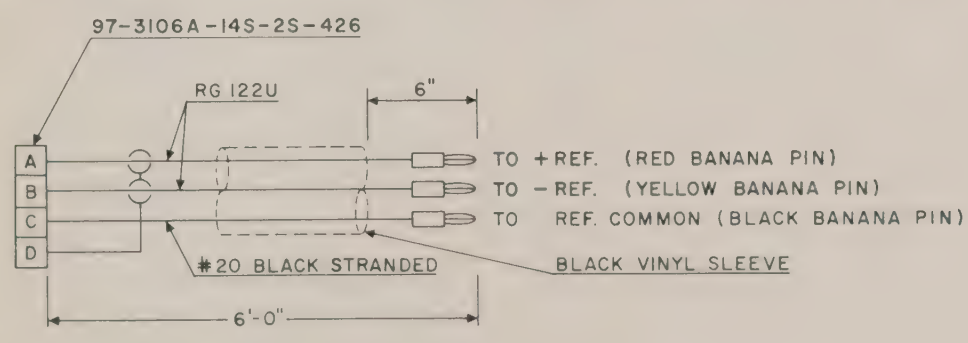
11420-230

SHEET 2 OF



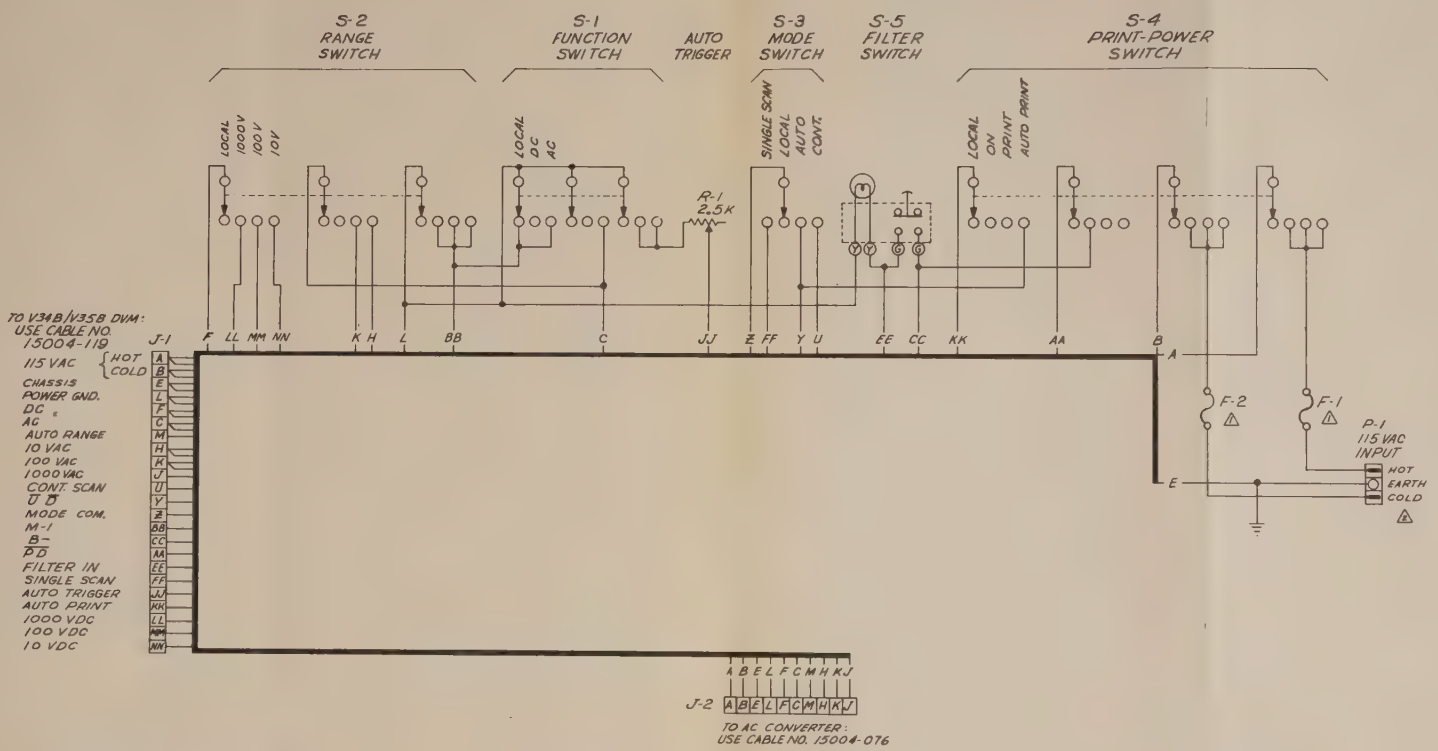
QTY	INCLUDED WITH THIS CABLE
1	#1410-C1 SAFE-T-KLIP
1	#1410-C2 SAFE-T-KLIP
3	#332-A SPADE LUGS, BIRNBACH
1	#31 ALLIGATOR CLIP, BIRNBACH

DRAWN BY R. COLLIER	DATE 8-1-60	TITLE	NON-LINEAR SYSTEMS INC.
CHECKED BY A.L.H.	DATE 8-1-60	CABLE, INPUT	DEL MAR AIRPORT
APPROVED BY [illegible]	DATE 8-1-60		DEL MAR, CALIFORNIA
FINISH			DRAWING NUMBER 15004-126
		SCALE / WT	SHEET OF



QTY.	INCLUDED WITH THIS CABLE
2	#1410-C1 SAFE-T-KLIP
1	#1410-C2 SAFE-T-KLIP
3	#332-A SPADE LUGS, BIRNBACH

DRAWN BY R. COLLIER	DATE 8-1-60	TITLE	NON-LINEAR SYSTEMS INC
CHECKED BY A.L.H.	DATE 8-1-60	CABLE, EXTERNAL REFERENCE	DEL MAR AIRPORT
APPROVED BY [illegible]	DATE 8-1-60		DEL MAR, CALIFORNIA
FINISH			DRAWING NUMBER 15004-125
		SCALE / WT	SHEET



6. THIS UNIT IS AN ACCESSORY, NOT A PART OF THE V34B/V35B; THIS DWG. IS INCLUDED WITH THE V34B/V35B DWGS. FOR REF. ONLY.
5. REMOTE CONTROL OF THE RATIO FUNCTION IS NOT AVAILABLE.
4. FOR REMOTE CONTROL THE DVM, SWITCHES MUST BE SET AS FOLLOWS: FUNCTION TO "DC," MODE TO "STANDBY," AUTO TRIGGER TO "MAN." RANGE TO "AUTO," POWER TO "OFF," & FILTER "OUT."
3. FOR LOCAL CONTROL AT THE DVM, S-1 THRU S-4 MUST BE SET TO LOCAL & FILTER "OUT."
2. PLUG POLARIZATION **MUST** BE OBSERVED.
1. FOR REMOTE CONTROL OF V34B/V35B, USE 3AG 1A SLO-BLO FUSE; FOR REMOTE CONTROL OF V34B/V35B **AND** THE 125C OR 125E CONVERTER, USE 3AG 1¼A SLO-BLO FUSE.

NOTES- UNLESS OTHERWISE SPECIFIED:

REVISIONS

SYM.	EFFECT	DESCRIPTION	DATE	APPROVAL

15094 sht 2

	11530		
	11430		
NEXT ASSY	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY REQD	

UNLESS OTHERWISE SPECIFIED — DRAWN BY B. COLLETTA 7-27-67 — TITLE: SCHEMATIC, REMOTE CONTROL

V34B/V35B

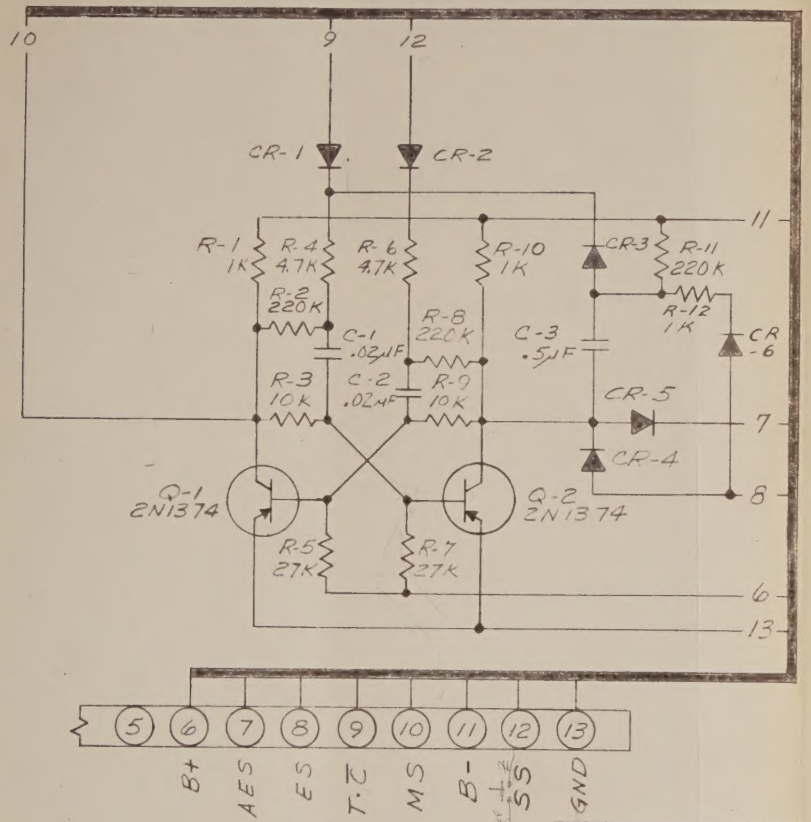
NON-LINEAR SYSTEMS INC. DEL MAR AIRPORT DEL MAR, CALIFORNIA

15094

SCALE — WT. — SHEET 2 OF

11430-860 SHEET 2 1

REVISIONS				
SYM.	EFFECT.	DESCRIPTION	DATE	APPROVAL
1	ALL	ADDED R-12	1-10-62	R.L.H.



NEXT ASSY	USED ON	NEXT ASSY	FINAL ASSY
APPLICATION		QTY REQD	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTION ± DECIMAL ± ANGLES ±

MATERIAL

FINISH

DRAWN BY	R. Colletta	DATE 8-7-61
CHECKED BY	R. Collier	DATE 9-7-61
APPROVED BY	R. Sobering	DATE 9-7-61

TITLE
SCHEMATIC - TRIGGER CONTROL BOARD

MODELS V34B/V35B

SCALE

WT.

NON-LINEAR SYSTEMS INC.
DEL MAR AIRPORT
DEL MAR, CALIFORNIA

DRAWING NUMBER 11430-860

SHEET 2 OF 2

1. DIODES ARE NLS TYPE 5003-002.
NOTES: UNLESS OTHERWISE SPECIFIED -

non linear
systems, inc.

DEL MAR, CALIFORNIA

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1022559